

XXIV. *Additional Observations on the Habits of Mygale.*
By S. S. SAUNDERS, Esq.

[Read 4th July, 1842.]

HAVING obtained several nests which were taken from the ground in the month of October, and incased in some of their natural earth within a small box the top of which was closed with bars of wood, I placed this box out in a balcony, where it remained neglected and unopened until the month of April following, when the spiders were all found alive and well, clinging to their opercula in order to prevent the same from being opened. This was effected by the bulb of the coverlid being firmly grasped with the four anterior feet and palpi, the remainder resting low down upon the posterior walls of the tube, while the porrected mandibles were firmly inserted in the front part of the tube near the top, thus offering a powerful resistance, greater than would have been effected by the mandibles acting upon the valve as mentioned by M. Audouin in his observations on *M. fodiens*.

The upper portion of two of these nests, which broke in the process of extraction, were then placed in an open flower-pot, with a sufficient quantity of the same earth well moistened and compressed, so as to form a compact body in imitation of the soil itself, the spiders clinging all the while to the coverlid without regard to their temporary exposure through the broken part of tube. Thus imbedded, it remained to be seen whether they would construct a new bottom to their nests, and whether such bottom would be closed where the tube now terminated, or be carried further down into the earth according to the usual depth.

A third spider was placed in the same pot, with his tube top in a *reversed* position, the operculum being buried to the depth of about three inches, and the open part of the tube, where broken off, being placed on a level with the surface, in order that the insect might be tempted to adapt a new door to this part in the actual emergency.

Fearing, however, that the spider might escape before the necessary steps could be taken to cover the pot with some transparent substance to observe the work, the hour being also late, a strong paper stopper was fixed in the top of the tube to await until the following day. This remained undisturbed up to eleven o'clock at night; but on my return in the morning I found this stopper lying aside, and the top of the tube closed with a single

layer of web and earth, offering but slight resistance to the touch, although by no means transparent; the side destined for the hinge (as marked by the circumference being here interrupted by a straight line), being on a level with the surrounding earth, whereas at the opposite part, where the lid would open, the new cover was lowered about one quarter of an inch.

The danger of disturbing the occupant in this stage of the work induced me to refrain from any attempt to open the new lid; but in order to ascertain whether the next layer would be added from without or from within, I dropped a certain portion of flour on the outside to whiten the top. The next morning, on examining the nests, I found to my great surprise that the new door had been entirely cut away, and was lying by the side of the tube, which in the place thereof was now found covered with a strong texture of whitish web. The next remained in the same state from the 26th of April to the 2nd of May, when it occurred to me that the spider had been compelled to discontinue its work in consequence of the earth not being any longer sufficiently moist for the purpose; and had therefore had recourse to the temporary expedient of closing its habitation in the way alluded to until another opportunity, when, supposing the nest to be in its natural site in the open ground, the necessary moisture should have afforded the required facilities. I gave the earth therefore a good watering, without however disturbing the web, allowing a slight sprinkling to fall thereon as a sort of warning notice; and the next morning on visiting the nest I found a new door perfectly formed, which, having marked with flour as above, was observed to remain unaltered from the 3rd to the 13th of the month, when, considering the work finished, I extracted the nest, which now presented an operculum at each end, both revolving on their hinges and complete in every respect.

The spider, mindful of the necessity of providing a rim for the support of the new valve, yet unable to regulate the process as it might have done in an ordinary case, had had recourse to the expedient of stretching in some degree beyond its natural dimensions the upper part of the web with which the tube is lined, making the surrounding earth give way in a like proportion.

Some explanation is thus afforded of the singular fact noticed on a previous occasion of some of the nests found at Zante being provided with an operculum at bottom as well as at top, the lower one being formed to open downwards in such a manner that it was obviously of little or no use to the occupant in its then state from its immovable position in the earth. The nests in question

being constantly exposed to the danger of becoming thus reversed in the process of opening the ground around the olive trees (an operation annually performed), the occupants in such cases might not improbably have recourse to a like expedient of closing the inverted tube with a new door.

The circumstance of the lower operculum being smaller than the upper one, would naturally occur in a nest so reversed, since the tubes are usually somewhat more spacious towards the bottom, so that when inverted and broken off, the new valve would of necessity be of greater dimensions than the original one. Still, however, the appearance of the lower operculum in the *Zante* nests was such as to lead me to entertain some remaining doubts whether this could have been the original entrance to the nest; perhaps the inconvenience experienced in those cases had only proved a partial one, self-adjusted subsequently by the gradual subsiding and settling of the clods.

With regard to the other two nests which I had placed in the same flower-pot with the one reversed as aforesaid, (these having, as already observed, no bottom to their tubes,) I had subsequently placed the pot in the open garden, finding that the domesticated habits of these spiders retained them to their homes, and wishing to afford them an opportunity of obtaining their natural food in accordance with their ordinary habits. After the lapse of some weeks however I became aware that the gardener had been in the habit of regularly watering this in common with other flower-pots; and seeing that the doors were nearly closed with the washings of the earth, I concluded that the inmates had fled; when, taking up the nests, I found the lower end much the same as when first placed in the pot, and the tubes themselves untenanted. Upon further search however I found both spiders embedded in the earth at a greater depth; whether or not they had been intent on prolonging their nests I cannot say, but at all events no tapestry had been produced for the lining of this portion of their mansions.

These tubes being now spoilt, I removed one of the spiders to the abode of one of its congeners, which was vacant and consisted of the bottom only, to see whether it would readily adapt itself to this change of domicile; and a new door was found finished the next morning with the same course of proceeding as in the former case, accompanied with the rejection of a paper stopper, the only difficulty experienced being in inducing the spider to enter the nest, which is equally witnessed on restoring one to its own abode after having extracted it, this being occasioned doubtless by the fear of molestation from within. I may add, that

there appears at all times a dulness of perception about these insects when abroad (however much kept from the light), which ill comports with their wonted sagacity at home. Indeed, during a long course of observation, I have never, under ordinary circumstances, seen one of these spiders quit its nest of its own accord (which is evidently a rare occurrence), or even to have its door open, whether by night or by day.

I have not been able to observe sufficiently the process of constructing a nest *ab initio*, although I had desired to do so, and for this purpose placed one of the spiders in a glass jar, with a sufficient quantity of its natural earth, after the required precaution of moistening, &c. By the next day no work had apparently been done beyond a partial disarrangement of the surface in one or two parts. The jar was placed in a corner of the room and completely shaded from the light, but no further progress was made during the day or evening. The subsequent morning, however, I found my spider partially imbedded in the earth, in which state it remained quiet throughout the day, and the following morning it had disappeared; when after close inspection, I observed an indistinct circular mark in one part near the side of the vessel, which proved to be the door of a new nest, as I assured myself a few days after by extracting the same, it having however only been carried down an inch or thereabouts into the earth, and being therefore still in progress of construction. Hence it appears, that it is not requisite to finish the tube in the first instance, the primary object being that of defence from without; neither did I observe that any portion of the soil had been thrown out in the process of excavation, the earth being probably got rid of in the formation of the compressed mass, known as the exterior walls of these habitations.

After having thus provided a variety of occupation for these little labourers, and obtained several nests with varying modifications, (and among these one which leads me to suppose that the double valves of the West Indian nests, described by Brown and Olivier, were probably the result of a new operculum being substituted for a damaged one, the old valve still remaining attached; or otherwise originated in the separation of the outermost layer of one of these valves, warped by tropical heat), I found that a new process had been adopted for the purpose of more effectually precluding further disturbances, the opercula being in two or three instances retained close shut by means of a firm texture of web; which having obliged me to tear away the whole top of one tube in the course of opening, I determined to

examine another with greater precision from within. This being effected by cutting off the top of one of these nests at about the depth of an inch, I found the inside perfectly secured; not, as I had supposed, by an assemblage of threads connecting the front of the valve with the lining of the tube, but by a complete tapestry thrown over the whole orifice of the tube in connexion with the operculum, so that the interior more resembled the top of a thimble, the texture being at the same time of the most delicate whiteness, and firm as that usually presented by the bulbous interior portion of the opercula.

I cannot say that the patience of these spiders had not been exhausted by my repeated experiments, although from a similar circumstance having taken place about the same time in several nests, the inmates of some of which had been comparatively less inconvenienced, I am rather disposed to attribute this proceeding to the ordinary inspirations and habits of their race.

I now determined to notice during how long a period this seclusion might last, the more especially as the powers of abstinence of these insects had already attracted my attention, not only from having never observed these spiders in quest of food, but from the very position in which six or eight of these nests had all along remained, deep in a box which had stood for six months on an elevated ballustrade upon the first floor, where, at all events, the supply of food must have been exceedingly limited, without any apparent effect, however, upon the usual corporature of the inmates.

It was not until the end of October that the valves were set free, at which period I again cut off the top of one which remained closed, and found it in the state before described, the spider being in perfect health, and presenting the usual plumpness of aspect. I did not, however, find any progeny in either of the nests.

Other six months have since elapsed, the box occupying the same place as before, and on observing the nests, I find four still tenanted, with the spiders in good condition, the opercula being, however, in a somewhat defective state from frequent handling, although the required preparations will doubtless be readily effected, so soon as the earth may be brought to a convenient state by proper watering, the covered position of the box having protected it from the ordinary atmospheric influences.

It cannot be doubted, that very many circumstances connected with the habits of these extraordinary insects still demand further inquiry, and in apologizing for the imperfect state in which

this notice is presented, it may be considered as the not unfrequent result of investigating the wonderful workings of instinct, that the more we direct our attention to the subject, the more we feel the want of more diligent research, and the insufficiency of our attainable results.

XXV. *Observations on the Species of Spiders which inhabit cylindrical Tubes covered by a moveable Trap-door.* By J. O. WESTWOOD, F.L.S. &c.

[Read January, 1840.]

OF all the habitations constructed by annulose animals for their own abodes, those cylindrical retreats lined with silk and fitted to the size of the creature's body, are amongst the most ingenious. These are of two kinds: 1st, those which are moveable, the creature generally weaving various extraneous materials into the texture of the web, and often with the greatest regularity, (amongst which I may particularly mention the nests made by the caddice worms and the caterpillars of various *Lepidoptera*); and 2ndly, those which are fixed, being formed either in wood or the earth. Instances of the latter are afforded by various species of wild bees and wasps, but they are of a comparatively rude construction compared with the cells of the trap-door spiders. The interest excited by the accounts of these spiders has been kept alive since the middle of the last century, when M. Sauvages published his account of an "*Araignée maçonne*," in the *Mémoires de l'Académie des Sciences*, for 1758. This species was the *Mygale cæmentaria* of Walckenaer, respecting which M. Dorthes published some additional particulars in the second volume of the *Transactions of the Linnæan Society of London*. Another South European species, *M. fodiens*, Walck., *A. Sauvagesii*, Rossi, has afforded to M. V. Audouin materials for a very interesting memoir, published in the "*Annales de la Société Entomologique de France*," vol. ii. pl. 14. These species have been separated from the genus *Mygale* by Latreille, under the name of *Cteniza*, but M. le Baron Walckenaer, in the first volume of his "*Histoire Naturelle des Insectes Aptères*," has reduced them again to a family of the genus *Mygale*. Our valued member, S. S. Saunders, Esq., has laid before this Society the details of the economy of another species, from Albania, which constitute one